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SCIENCE

junior division – volume one

EDUCATIONAL TELEVISION SERIES 1967-68

Educational Television Branch
ONTARIO DEPARTMENT OF EDUCATION
1670 Bayview Avenue / Toronto 17

program schedule

SCIENCE
junior

10 programs
First in series is one half-hour in length; others are twenty minutes

PROGRAM NO.	CBC 10:00	CBC Repeat 10:00	CBOT 9:40	CHCH 9:30	CJOH CJSS 9:30
1	Oct. 16	Mar. 27	Oct. 30	Oct. 24	Oct. 17
2	Oct. 23	Apr. 3	Nov. 6	Oct. 31	Oct. 24
3	Oct. 30	Apr. 10	Nov. 13	Nov. 7	Oct. 31
4	Nov. 6	Apr. 17	Nov. 20	Nov. 14	Nov. 7
5	Nov. 13	Apr. 24	Nov. 27	Nov. 21	Nov. 14
6	Nov. 20	May 1	Dec. 4	Nov. 28	Nov. 21
7	Jan. 10	Jan. 12 (10:10)	Jan. 22	Jan. 16	Jan. 9
8	Jan. 17	Jan. 26 (10:10)	Jan. 29	Jan. 23	Jan. 16
9	Jan. 24	Feb. 2 (10:10)	Feb. 19	Feb. 6	Jan. 30
10	Jan. 31	Feb. 9 (10:10)	Feb. 26	Feb. 13	Feb. 6

cover photograph courtesy Ontario Department of Lands and Forests

IMPORTANT *PLEASE NOTE!*

Principals of schools are asked to fill in the label below and indicate the quantity required for VOLUME TWO OF THIS GUIDE, by circling the figures 2 5 or 8.

One copy of volume two will be sent automatically without returning the label; this form is for more than one guide.

- DETACH PAGE ALONG PERFORATION
- TYPE YOUR NAME AND ADDRESS ON THE LABEL
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1670 BAYVIEW AVENUE, TORONTO 17, ONTARIO

to : _____

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SCIENCE, Junior, Volume 2 2 5 8

SCIENCE—Junior Division

6 programs for the junior grades. The first program is 30 minutes in length, the remaining five are 20 minutes each

This is volume 1 of a 2 volume series. Volume 2 will appear for those programs scheduled to begin in January titled: "Fossils and Dinosaurs" and "Rockets and Satellites"

THE STREAM COMMUNITY

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Optimum Viewing Conditions		inside back cover

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general introduction

This series of six programs is based upon the unit "The Stream Community" recommended for the pupils of the sixth year (see P1, J1, Interim Revision Science). It is anticipated that the six programs will be of the greatest value to the upper junior division. However, if facilities are available, pupils in the intermediate division should be given the opportunity to benefit from the program as well.

The prime objectives of the series are:

—to see the world outside the classroom as a laboratory for the study of science

—to show small groups of pupils actively engaged in scientific inquiry,

—to develop an appreciation and understanding of natural environment

—to gain experience in using scientific methods

—to see the application of scientific principles

—to encourage pupils to seek relationships and pattern

—to show a variety of creative activities for reporting and recording

The six programs follow one class as it divides into groups to investigate different aspects of a stream. Following the first program, which is an actual field trip, the study of the individual groups is shown in the classroom situation. Each of these programs includes considerable film footage showing the group at the stream conducting experiments and recording its findings.

Note: This series is first broadcast during the fall. It is thus in one sense untimely. However, field trips of the sort described on the programs, along with variations of the activities seen, can be conducted at any time of the year. It is hoped that the programs will lead classes to explore the outdoors during the fall and winter. This series is repeated in the spring.

SUGGESTED PREPARATION FOR A FIELD TRIP

1. Obtain permission from the proper authorities including the principal, parents, and the property owners of your particular site.
2. Visit the stream and study its possibilities. It is suggested that the teacher spend one hour of study of the site for every hour of class time at the site.
3. Select a stream which has as many of the following characteristics as possible:
   a. narrow enough in some parts to be straddled,
   b. reasonably shallow, but with some variation in depth,
   c. width sufficiently variable to make a marked difference in the rate of flow,

d. bottom of the stream varying from a clay bottom (fine) to a stony bottom,
e. meandering,
f. ample plant and animal life,
g. readily accessible, the slope of the bank area being moderate enough to permit ease of study,
h. sufficiently clear to permit group investigation.

SUGGESTED EQUIPMENT

1. Equipment for Collecting

—jars (large and small)
—sieves (large and with long handles)
—nets (made from fibreglass)
—small animal or bird cages for containing animals caught
—leather gloves

2. Equipment for Measuring

—thermometers
—tape measures (cloth tapes are better)
—stop watches
—a watch speedometer (can be made by pupils)
—ball and/or block of wood for measuring stream speed
—yardstick for measuring stream depth

3. Transporting Equipment

—large pots or pails to bring back potted plants
—cooler to maintain temperature until specimens reach the classroom

CLASS PREPARATION PRIOR TO THE VISIT

1. Assemble equipment.
2. Discuss and demonstrate techniques and equipment.
3. Review general instructions:
   a. basic instructions concerning dress, time of departure, return to school, etc.
   b. instructions concerning purpose, methods, organizations, etc.
4. Arrange the positioning of individual groups so that groups which muddy the stream and disturb the stream bed are downstream from the other groups.
5. Discuss recording techniques and design sheets for the recording of data collected.
6. Make sure that groups have assigned individual responsibilities such as that of recorder, etc.

program one

A VISIT TO A STREAM

The purpose is to show viewing pupils how to set about studying a stream in their own area and how to gather data about it. The program does not attempt to provide all the answers but leaves this for their own investigations.

PROGRAM CONTENT

The first program in this series is a field trip to a stream. It shows five groups of children measuring and examining different aspects of the stream as well as collecting and studying the plant and animal life in the stream environment. It forms the basis for the remaining five programs.

The first group is shown investigating the streams current. By measuring a ball over a twenty-five foot distance and the number of revolutions of a water speedometer, the rate of flow can be determined. The surface currents are examined by sprinkling wood shavings on the water. One pupil is shown measuring the temperature of the stream at one location.

The second group of students illustrate the methods used in examining the stream bed. Pupils are shown measuring the width of the stream in one of the nine areas selected for study. Others are shown measuring the depth at five points across the stream. Finally one pupil is shown examining and measuring the sizes of stones found in the five points across the stream. The data collected will enable him to see the sorting action of the stream at this particular area.

The group identifying plants and surveying where they grow in relation to the stream forms part three of this program. Close-ups of the skunk cabbage, ferns, jack-in-the-pulpit and Solomon's seal are shown. As a sampling technique, a transit line is used. Pupils, beginning at the stream, turn a hoop end-over-end for ten turns and count the occurrence of the four plants that the group is surveying.

The fourth group are seen catching and examining small aquatic animals. Viewers can see how the nets used are constructed. They will also see the method used by the pupils to catch the insect larvae. Some interesting close-ups will assist the viewer in identifying some of these creatures.

Finally, we see a group of pupils catching larger animals such as a racoon, frog, toad, etc. Interesting close-ups show some of the features of these animals.

SUGGESTED PRE-VIEWING ACTIVITIES

List on the blackboard several definitions of a stream as offered by pupils within the class. Definitions will vary from those which include such things as the banks, bed, etc. The program illustrates the concept that the stream is an entire community which includes the plants and animals in and around the stream as well as the water, bed and banks. The individual definitions of the pupils should be accepted without comment and discussed at the conclusion of the program.

SUGGESTED POST-VIEWING ACTIVITIES

1. Discuss and refine pupils' definitions of "a stream".

2. Permit pupils to discuss and even speculate about the data that will be collected and the accuracy of the measuring techniques. Encourage them to suggest some of their own.
3. Ideally, it is hoped that the pupils will wish to begin a study of a stream in their community. This will provide an excellent opportunity for them to compare the results of their stream with the stream used in the program. This is the best possible follow-up for the program and if it is at all possible it should be undertaken by the class.

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program two

CHARACTERISTICS OF STREAM FLOW

The purpose is to introduce the pupils to some of the factors which affect stream flow and at the same time encourage them to seek information about a stream in their own locality.

PROGRAM CONTENT

The program is introduced with film showing pupils measuring the speed of the stream with the ball and the water speedometer. Viewers will see the ball and the speedometer in areas which show marked differences in their speed. Close-ups will show the current's patterns on the stream's surface.

The scene will then shift to the classroom and will centre around a discussion by the group of pupils who studied this aspect of the stream. They discuss the merits of the techniques used and attempt to evaluate their findings. Flashbacks to the stream will illustrate their findings and the problems they are attempting to solve.

The program will conclude with two students discussing and explaining the maps of the area they are preparing.

SUGGESTED PRE-VIEWING ACTIVITIES

Discuss with the pupils their opinions on the following questions:

1. Will a stream flow at the same rate at each point along its course?
2. At any one point along a stream will the rate of the current be the same all of the way across the stream?
3. Will the amount or the volume of the water vary between rapid and slower parts of the stream?

SUGGESTED POST-VIEWING ACTIVITIES

1. Discuss the answers to the above questions in light of the information provided by the program.
2. Develop the concept that a stream is but a small river and that the flow patterns of a stream are similar to the flow patterns of a river. The effects of currents upon transportation, hydro production, erosion, etc., may well provide a beginning to an investigation in these areas.

3. Once more it is hoped that the class will wish to compare the findings, observations and conclusions made by the television class to those they make of their own stream.

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program three

STRUCTURE OF THE STREAM BED

The purpose of this program is to help viewers realize the close relationship between the width, depth and speed of the stream and how these three affect the shape of the stream bed as well as the size of particles which are found on the bottom of the stream.

PROGRAM CONTENT

Activities of the group seen on the first program studying the relationship between stream width, depth and speed will be shown in greater detail. In the classroom segment, pupils discuss the data collected and the role played by each in determining the shape of the stream and the nature of the stream bed. They discover that the width, depth, speed and fall of the stream all help to determine the shape of the stream. They also learn that the sorting action of the water is largely determined by the speed of the water.

Mr. Rod Bain of London Teachers' College discusses with the class their problems and demonstrates with a model of the stream made by the pupils, some of the factors affecting the stream bed.

SUGGESTED PRE-VIEWING ACTIVITIES

Program three actually continues the mechanics of the stream as started in program two. Have the pupils suggest what factors affect the flow of a stream. Even before viewing the program they might conclude that the width, depth, fall of the stream and the volume of the water passing down the stream as well as the nature of the bed will all affect the stream's flow. Encourage them to seek the evidence of this while they view the program.

SUGGESTED POST-VIEWING ACTIVITIES

1. Verify the conclusion reached in the pre-viewing discussion.
2. Illustrate the sorting action of the water by shaking a jar of water and gravel and permitting it to settle.
3. Have pupils recall experience in wading in a rapid and slow moving stream. In which was the bottom stony? Smooth?
4. Visit a stream. Note the shape and character of the bed at various locations. As an example select a curve in the stream. Where is the bed the deepest? How do the size of the particles on the outside of the curve compare with those on the inside of the curve? Where is the greatest amount of erosion taking place?
5. Observe the channel (deepest part) in the stream visited. Is it always in the middle of the stream?

program four

PLANT LIFE IN AND AROUND THE STREAM

The purpose of this program is to introduce the pupils to the concept of zonation in plants through observing the changes in plant life as one moves from the moist environment of the stream to another environment.

PROGRAM CONTENT

The program opens with film showing the plant group at the stream collecting and potting various plants and surveying their location in relation to the stream. We then see this group back in the classroom. During the discussion which takes place, close-ups show the difference between such plants as the skunk cabbage and the burdock. Close-ups of the plants surveyed (skunk cabbage, ferns, jack-in-the-pulpit, and Solomon's seal) are shown. Through this close examination of individual plants, the pupils see how a particular plant is adapted to thrive in its environment.

Dr. J. W. Judd of the Department of Zoology, University of Western Ontario, visits the group at the stream and answers questions such as: why does the skunk cabbage grow so close to the stream; what is the difference between the true and false Solomon's seal and why have so many trees near the stream fallen over.

SUGGESTED PRE-VIEWING ACTIVITIES

By means of a short field trip around the school property, the pupils may be able to observe that certain plants grow better in certain environments (such as shade) while others do better in a different environment (sunny). Thus the class is introduced to the concept of zonation and that plants, like animals, have particular needs.

A discussion might develop about what the environment of a stream would be like. How would the environment for plants change as one moves farther from the stream?

SUGGESTED POST-VIEWING ACTIVITIES

1. Collect examples of the plants discussed on television and permit pupils to see them first hand.
2. Set up an aquarium and transplant water plants from a stream or pond and observe those which survive best.
3. Examine scum, algae and grasses under a microscope or with a hand lens.
4. By visiting a stream community, observe types and changes in plant growth as one proceeds farther from the stream.
5. Discuss how plants help in the control of erosion by protecting the soil from heavy rains, by holding it in place with their roots and by forming obstructions such as natural dams to slow down the stream.

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program five

AQUATIC ANIMAL LIFE

The purposes of this program are to introduce pupils to some of the common, but rarely seen, small animal life in the stream; to show them variety in nature and the ways of animal camouflage.

PROGRAM CONTENT

Once more the program begins with a return to the field trip of program one. The technique for catching the small aquatic life is recalled. The classroom segment shows this group discussing and examining under microscopes such animals as the mayfly and caddisfly larvae, etc. Pictures obtained through research are compared to their specimens.

Dr. R. H. Stinson from the Department of Zoology, University of Western Ontario, discusses the group's problems with them. Discussion centres around the caddisflies and establishes where they are found, how they camouflage themselves, etc. Excellent close-ups are shown of the different cases of the caddisfly as well as of other specimens caught by the group.

SUGGESTED PRE-VIEWING ACTIVITIES

Unless pupils have some knowledge of the small insect larvae usually found in the stream, it might be well to introduce this program by discussing and listing the animals normally associated with a stream. Pupils can then be led to conclude that there are other animals that cannot be seen because they are either too small or too well hidden. These are the animals that this program will deal with.

SUGGESTED POST-VIEWING ACTIVITIES

1. Discussion in the ways in which animals used camouflage to protect themselves in this program could be expanded to a general investigation of camouflage in nature.
2. Caddisflies and mayflies might be caught and introduced to the class aquarium.
3. A caddisfly larva might be placed in an aquarium containing only water and crushed glass. It will then construct a transparent "glass" case.

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program six

LARGER ANIMAL LIFE

The purposes of this program are to emphasize the need to maintain in the classroom as nearly as possible the natural environment of the animal; to encourage careful observation of animal adaptations.

PROGRAM CONTENT

In the portion of the program showing the children at the stream, we see how they catch animals such as the raccoon, frog and toad. Close-ups of animals such as the chipmunk eating are also included. Some of the birds of the area, crayfish and fish are also shown.

Dr. R. H. Stinson of the University of Western Ontario pays a return visit and discusses the difficulties experienced by the class in keeping their specimens alive. The dragon fly's life history and food are discussed. Some techniques in the dissection of a garter snake are demonstrated.

SUGGESTED PRE-VIEWING ACTIVITIES

This program might be introduced by discussing with the pupils those animals which are normally found in the stream environment. Those that live in, on and near the stream should be included.

SUGGESTED POST-VIEWING ACTIVITIES

1. This program might well introduce a study of why animals live near a stream. It must offer them shelter, protection from their enemies and a source for food. The concept that other animals such as the raccoon live there because the stream is the home of many of the animals upon which it depends for food should be developed.
2. A study of how animals are adapted to live in a particular environment and to catch their food might be begun.
3. An investigation of the animals which live in and around a stream in the pupils' community might well be undertaken.

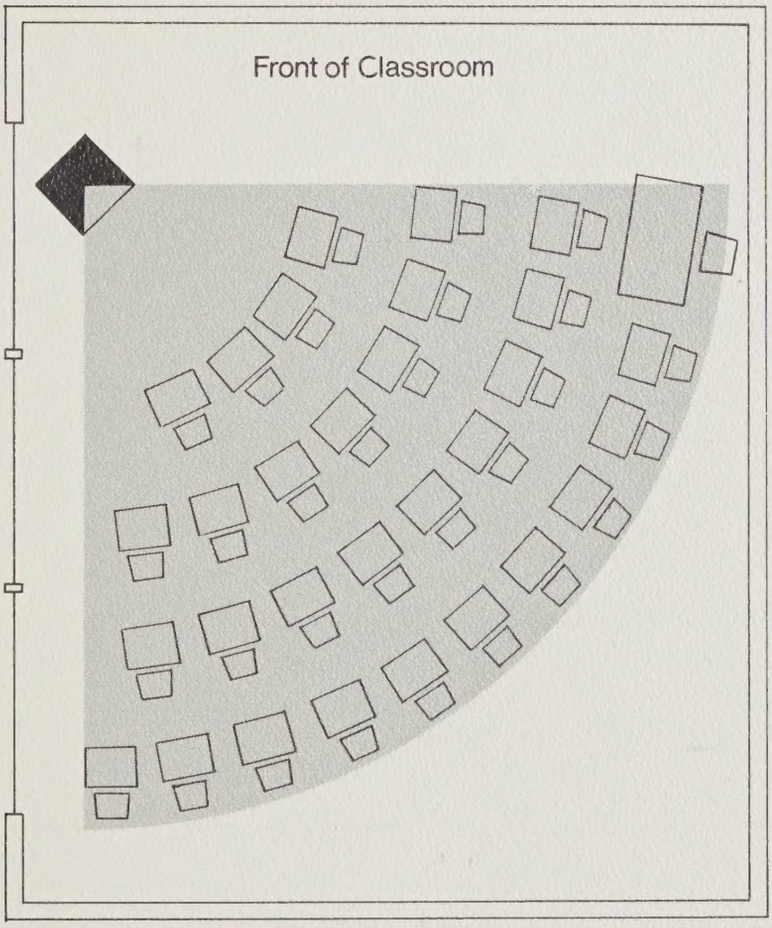
FOR OPTIMUM VIEWING CONDITIONS

1. Review Teacher's Guide well in advance of each telecast.

2. Have the set on and adjusted, sound off, prior to telecast.

3. Assure student comfort
   - — located for best viewing
   - — no glare, reflection on screen
   - — room properly ventilated
   - — suggested materials ready
   - — within maximum of 20′ of the screen

4. Seat yourself where you can observe both the telecast and your students' reactions.



This diagram shows the suggested placement of the television set: